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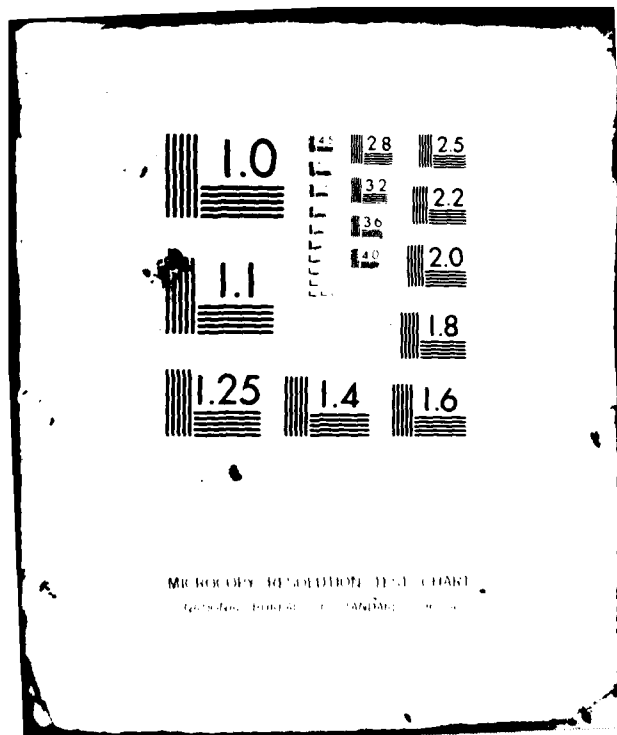
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David J. Armor

October 1981

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David J. Armor
The Rand Corporation
October, 1981



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ENLISTMENT STANDARDS IN THE ARMY

During the coming decade the Army faces a serious challenge to its manpower quality and quantity. The Department of Defense announced recently that the aptitude screening tests used during the late 1970's were incorrectly calibrated, thereby inflating test scores of recruits (OASD, MRA&L, 1980). This error led to a significant decline in Army manpower quality in the last half of that decade. This trend was reversed in 1981 by introduction of a correctly calibrated test, and there has been a significant drop in the number of low aptitude Army recruits during the 1981 fiscal year.

The decline in Army recruit aptitude appears to have led to diminished manpower effectiveness as measured by on-the-job performance. Assuming a continued all-volunteer force (AVF), restoring Army manpower quality and quantity to draft-era levels will require substantial increases in Army recruiting expenditures.

Since these developments are fairly recent and have received relatively little public discussion, I would like to document the magnitude of the decline in Army recruit quality and show its impact on job performance. I will then discuss a research approach for determining "optimal" quality mixes, and what it might cost to restore Army recruit quality to pre-AVF levels.

DECLINE IN ARMY RECRUIT QUALITY

When the president's Gates Commission recommended an all-volunteer armed force (AVF) in 1970, it contended that the AVF would not suffer

any serious declines in manpower quality. Supporting studies argued that draft-era enlistment standards could be maintained, and that sufficient numbers of high quality personnel--defined as high school graduates and persons with higher mental aptitude scores--could be attracted to the AVF providing that pay and benefits were on par with comparable civilian jobs (Sullivan, 1970).

During the early years of the AVF this forecast appeared accurate. In 1977 a widely-cited Rand report found that the AVF "can attract a socially representative mix of the desired quantity and quality of new recruits...at a cost substantially lower than commonly assumed," (Cooper, 1977). Indeed, the Rand report goes on to conclude that "the quality of new recruits, as measured by such indicators as mental aptitude and educational attainment, has actually increased since the removal of the draft."

By 1980, however, the Gates Commission's prediction had failed. The positive picture painted by the early Rand study was based in part on improperly calibrated aptitude tests used during the 1970's. In 1980, the Department of Defense acknowledged that the aptitude battery used for determining enlistment eligibility between 1976 and 1980 had been "misnormed," which means that prospective recruits received higher scores than they would have received on a correctly calibrated test. As a result, many persons entered the services during the last half of the 1970's who did not meet draft-era enlistment standards; and in fact would not have been eligible to enlist with corrected scores.

The Army was especially hard-hit by the influx of low aptitude recruits. Figure 1 shows the trends in low and high aptitude recruits

over the past 20 years. Low aptitude recruits, labeled "Category IV," score below the 30th percentile of the general population (but above the 9th) while high aptitude recruits, "Category I and II," score above the 65th percentile of the general population.[1]

During most of the 1960's fewer than 20 percent of Army recruits were Category IV, except for a few years during the Vietnam conflict when they rose to nearly 30 percent. After the draft ended, however, corrected aptitude scores show that the proportion of Category IV personnel increased steeply, and by 1980 virtually one-half of all Army recruits fell into the lowest allowable mental category.

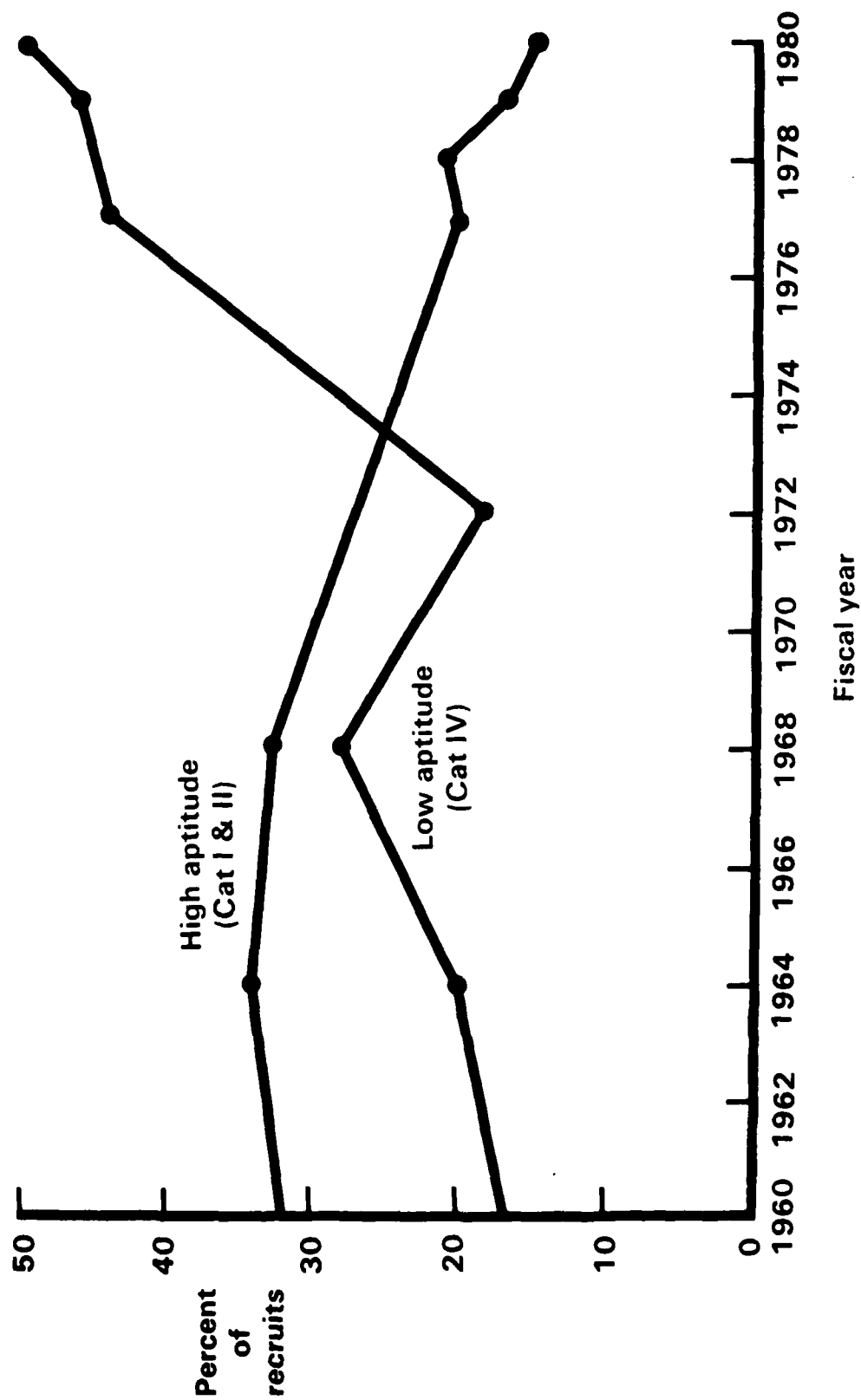
A less discussed but equally significant finding is that the proportion of Category I and II recruits dropped sharply, from about one-third of all recruits in the draft years to a mere 15 percent by 1980. During an era when Army weapons systems have become increasingly complex and sophisticated, the number of enlisted personnel needed for leadership and for high-skill maintenance is less than half what it used to be.

These declines in aptitude levels have been paralleled to some extent by declines in education levels. During the 1960's about two-thirds of all Army recruits were high school graduates. Graduates diminished to about 57 to 58 percent during the late seventies, and to only 50 percent in 1980. The decline in education status has been less severe than the decline in aptitude levels because the services prefer low aptitude graduates over high aptitude non-graduates. As we shall

[1] The lowest 9 percent--Category V--are excluded from military service by statute.

FIGURE 1

TRENDS IN HIGH AND LOW APTITUDE ARMY RECRUITS



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see in a later section, this may not be the most cost-effective policy.

IMPACT ON JOB PERFORMANCE

While there is no question about the decline in Army recruit aptitudes, there has been much debate on the impact of mental aptitudes on manpower effectiveness as indicated by on-the-job performance. This debate was stimulated by the Gates Commission, which concluded that Category IV personnel and non-high school graduates could perform as well as higher quality personnel in many military jobs, and that the armed services could afford to lower enlisted standards if economic conditions so dictated.

This position received further support from the 1977 Rand report, which argued that Category IV high school graduates are more productive in low and medium skilled jobs than high-ability non-graduates (Cooper, 1972). The report recommended specifically that the military recruit more Category IV high school graduates. In 1980, Secretary of the Army Clifford Alexander went even further when he testified before Congress that mental categories were basically useless in predicting success in Army jobs (Alexander, 1980). The Secretary was not concerned about the high levels of Category IV recruits revealed by corrected test scores, and in fact he proposed abolishing mental category distinctions altogether.

One reason for the debate about mental ability has been the absence of good on-the-job performance measures. Many studies of job performance have relied upon supervisors' ratings, in spite of their notorious reliability problems. Most of these studies find little or no

relationship between aptitude test scores and job performance (see Vineberg and Joyner, 1981). Other studies have found that mental aptitudes predict grades in training schools and scores on job knowledge tests, but critics argue that school grades and job knowledge involve verbal abilities not actually needed for on-the-job performance in lower skill jobs.

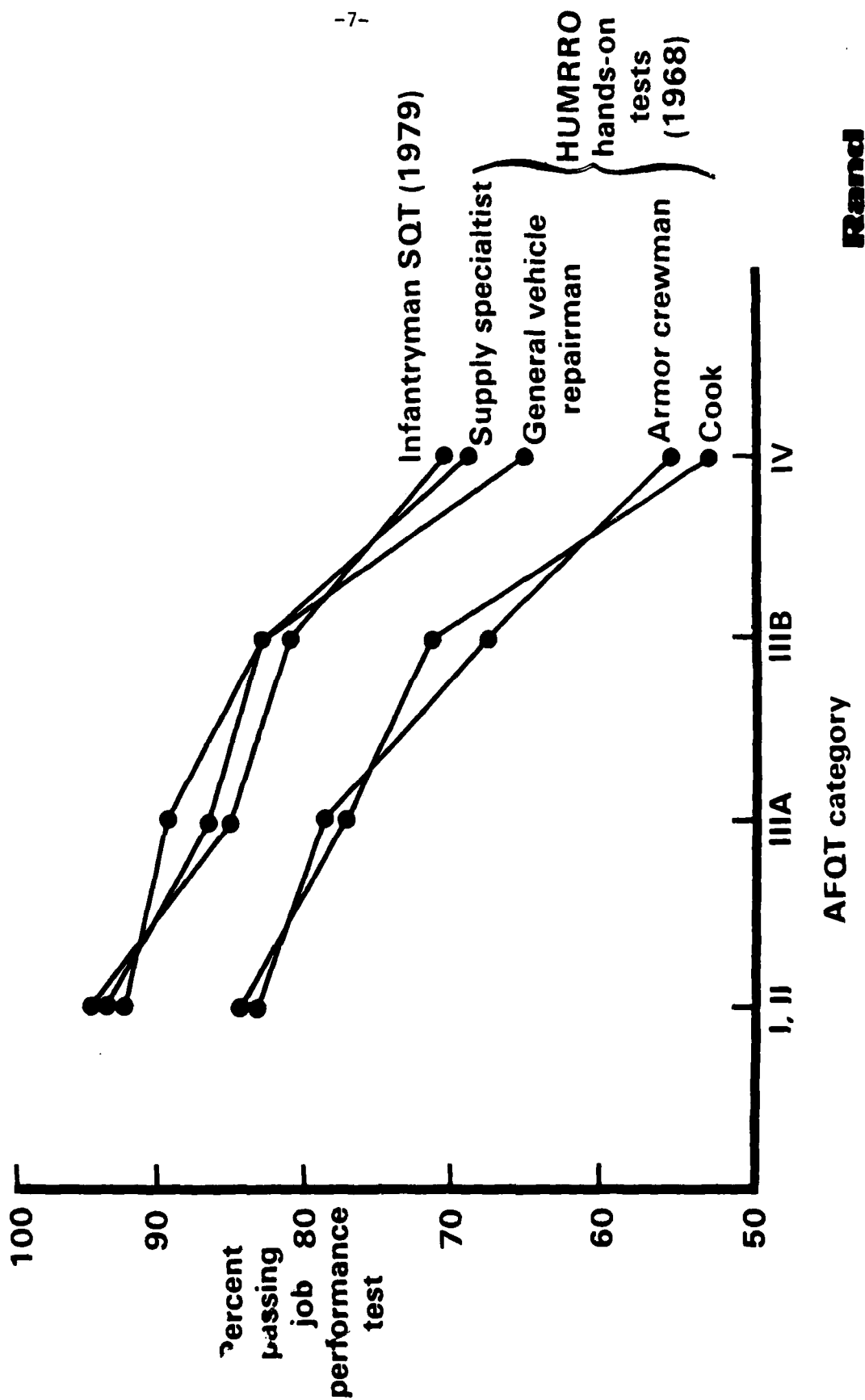
This measurement dilemma may have been solved with the development of hands-on performance tests in the Army. In 1968 an Army research group (HUMRRO) developed comprehensive hands-on performance tests for four Army jobs: Armor Crewman, Vehicle Repairman, Supply Clerk, and Cook (Vineberg and Taylor, 1972). These tests were based on a sample of tasks deemed crucial for the job in question, and were administered by trained specialists who scored the actual performance on each task. The Army converted these research tools into operational Skill Qualification Tests (SQT) to evaluate on-the-job performance, and SQT's were developed for most Army jobs during the late 1970's. The SQT's differ from the HUMRRO tests by inclusion of written and supervisor rating components in addition to the hands-on component.

Figure 2 shows the relationship between mental category and passing the job performance test for the four HUMRRO jobs and for the Infantryman SQT.[2] The relationships between job performance and mental category is strong and consistent across all five Army jobs. From 85 to 95 percent of Category I and II recruits can pass the job performance test, compared to only 55 to 70 percent of Category IV persons. It may

[2] By "pass" is meant a score of 60 percent on the Infantry SQT (set by the Army as minimum proficiency) or a score of 50 percent for the four HUMRRO tests.

MENTAL ABILITY AND JOB PERFORMANCE IN FIVE ARMY SPECIALTIES

FIGURE 2



come as a surprise to many that this relationship is strong for jobs representing low to moderate skill levels. Clearly, as Army recruits decline in aptitude, average job performance levels will also decline.

Interestingly, high school status has little impact on job performance as measured by these tests. But non-high school graduates have higher attrition rates compared to graduates, as shown in Figure 3 for Infantrymen (whose pattern resembles the Army as a whole). After three years a cohort of high school graduates loses about 30 percent to attrition, but non-high school graduates lose over 50 percent. Mental aptitudes have little additional impact on attrition once high school status is taken into account.

Declining levels of manpower quality, as measured by mental aptitudes and high school status, have adverse effects on manpower effectiveness as measured by job performance and attrition. Therefore, one cannot help but conclude that the effectiveness of Army manpower has deteriorated during the all-volunteer era.

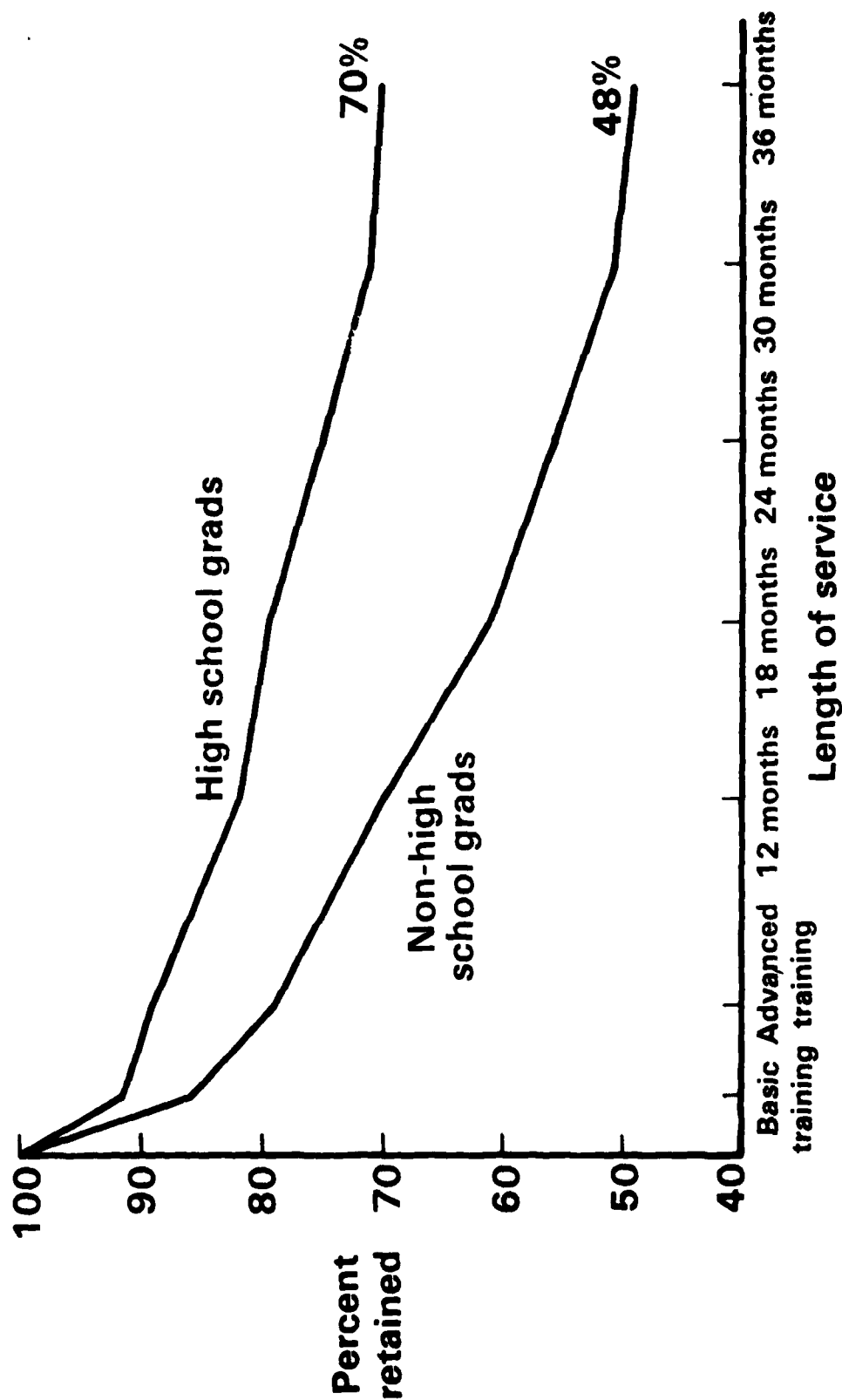
MAINTAINING ARMY RECRUIT QUALITY

What can be done to reverse this decline and restore Army manpower quality to pre-AVF levels? Most important, what will it cost? Rand has been studying these issues for the past year and some preliminary cost estimates have emerged, assuming continuation of the AVF.

It is one thing to show that recruit quality predicts subsequent job performance; it is another matter to set specific quotas on high and low ability recruits, high school graduates, and so forth. The enlistment standards set during the draft era were based primarily on

FIGURE 3

LENGTH OF SERVICE AND HIGH SCHOOL STATUS FOR FIRST-TERM ARMY INFANTRYMEN (FY 1977 ACCESSIONS)



training school outcomes, and were viewed as "trainability" requirements. None of the enlistment standards were justified by on-the-job performance measures such as the SQT. Moreover, many Category IV recruits can pass the SQT, many non-graduates can complete their full term of enlistment, and both groups appear to be in plentiful supply with minimal recruiting costs. While higher ability graduates have lower rates of attrition and higher SQT pass rates, they also cost more to recruit in the form of college benefits, cash bonuses, and larger recruiting budgets.

The approach taken in the Rand work is to investigate the tradeoffs between the greater cost and better performance rates of high ability recruits versus the lesser cost and poorer performance rates of lower ability recruits. Performance is defined as months of service contributed by personnel who successfully complete training, remain in the service, and pass the SQT. We then ask the question of whether there is an "optimal" ability mix that minimizes force costs for a given level of performance.

This tradeoff analysis has been designed as a computer simulation model, and it has been applied to the Army Infantry. The preliminary results give some insight into the debate about the cost-effectiveness of different ability groups.

First, under a variety of recruiting cost assumptions, the model shows that, compared to recruits in recent years, "optimal" ability mixes have fewer Category IV recruits, more Category I and II recruits, and more high school graduates from the upper half of the aptitude distribution (Category I, II, and IIIA). Although high ability recruits

cost more in the form of enlistment benefits, these costs are more than offset by savings from reduced attrition and increased job performance. It appears that optimal ability mixes would have about 20 percent Category IV recruits, about one-third Category I and II recruits, and about 35 percent Category I-III A high school graduates, compared to recent levels of 50, 15, and 20 percent, respectively.

Secondly, the model shows that, contrary to current policy, high ability non-graduates are somewhat more cost-effective than low ability graduates. The reason is that the former group's higher attrition is less costly than the latter group's poor job performance. Our optimal ability mixes show about equal numbers of Category IV graduates and Category I-III A non-graduates, compared to a current ability mix weighted heavily towards the first group.

Finally, our analysis shows that attaining these ability mixes will require considerable increases in Army recruiting and benefit budgets. If the Infantryman results hold up for all combat and other critical jobs, and if the Army maintains its current manning objectives, then restoring the ability mix to pre-AVF levels could cost on the order of 200 million dollars per year. Moreover, if Army enlistment incentives attract recruits from other services--rather than expanding the recruit pool--the other services might have to offer similar enlistment incentives, adding further costs.

The Congress and the Army have already acted to stiffen enlistment standards and to spend more money on attracting high-quality recruits. Congress has ordered all services to limit Category IV recruits to 25 percent in 1982 and to 20 percent in later years, while limiting non-

high school graduates to 35 percent. These quotas approximate the optimal levels shown by our analysis. At the same time, Congress has allowed the Army to offer substantial bonuses and educational benefits to high quality recruits in selected jobs. In 1981 the bonus was \$5,000 for a four-year enlistment in combat specialties, plus a college benefit of about \$5,000.

Although these enlistment incentives may seem large, our analysis suggests that they will not be sufficient to meet both recruit quotas as well as the new ability mix requirement. The Congress has approved new benefits for high ability recruits in 1982, including an increased college contribution of \$17,000 and higher cash bonuses for the combat arms. The new program may be sufficient to restore manpower quality and quantity to its pre-AVF levels, but the eventual annual cost will be substantial.

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